

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY


(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 07 OCT 2005

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| Applicant's or agent's file reference BPX 10029 | FOR FURTHER ACTION | | See Form PCT/PEA/416 |
| International application No. PCT/GB2004/002763 | International filing date (day/month/year) 28.06.2004 | Priority date (day/month/year) 30.06.2003 | |
| International Patent Classification (IPC) or national classification and IPC E21B43/10, E21B29/10, E21B41/00 | | | |
| Applicant BP EXPLORATION OPERATING COMPANY LIMITED et al | | | |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 10 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> sent to the applicant and to the International Bureau) a total of sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> | | | |
| <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input checked="" type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p> | | | |
| Date of submission of the demand 17.12.2004 | | Date of completion of this report 11.10.2005 | |
| Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016 | | Authorized Officer van Berlo, A Telephone No. +31 70 340- | |



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Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-17 as originally filed

Claims, Numbers

1-30 as originally filed

Drawings, Sheets

1/6-6/6 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify)*:
 - ☐ any table(s) related to sequence listing *(specify)*:
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify)*:
 - ☐ any table(s) related to sequence listing *(specify)*:

* If item 4 applies, some or all of these sheets may be marked "superseded."

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Box No. IV Lack of unity of invention

1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
 - ☒ paid additional fees.
 - ☐ paid additional fees under protest.
 - ☐ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
 - ☒ not complied with for the following reasons:
see separate sheet
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☒ all parts.
 - ☐ the parts relating to claims Nos. .

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | |
|-------------------------------|-------------|----------------------------|
| Novelty (N) | Yes: Claims | 7,14-16,19,20,24,25 |
| | No: Claims | 1-6,8-13,17,18,21-23,26-30 |
| Inventive step (IS) | Yes: Claims | 7 |
| | No: Claims | 1-6,8-30 |
| Industrial applicability (IA) | Yes: Claims | 1-30 |
| | No: Claims | |

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

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Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

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Re Item IV.

The separate inventions/groups of inventions are:

1. Claims: 1-13,17,18,21-23,26,30

Expanding a tubular patch

2. Claims: 14-16,24,27

Deformed patch

3. Claims: 19,20,25,28,29

Patch with section of increased wall thickness

They are not so linked as to form a single general inventive concept (Rule 13.1 PCT) for the following reasons:

An apparatus for expanding a tubular patch according to claim 1 is known from US2002/0185274.

Expanding a tubular patch according to the first invention differs from US2002/0185274 by the features of claim 7, namely by the provision of dedicated electric motors for the various movements to be performed. These features are therefore considered the contribution over the prior art and define as such the special technical features of the first invention.

The potential special technical feature of the second invention is the deployment of the patch below a restriction.

The potential special technical feature of the third invention is the section of the patch with an increased wall thickness.

The problems solved by these (potential) special technical features are:

1) To provide an alternative solution to the downhole control/drives for movement of various elements (page 16, line 21-26)

2) To be capable of passing through minimum restriction (page 11, line 29-31)

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3) Sufficient plastic deformation to achieve seal (page 13, line 15-25).

As the (potential) special technical features are not the same and as do not correspond as they solve different problems, a technical relationship as required by Rule 13(2) PCT is not present and therefore the requirements of unity of invention are not fulfilled.

Re Item V.

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- 1 The following document is referred to in this communication:
D1 : US 2002/185274 A1 (SIMPSON NEIL A ET AL) 12 December 2002
D2: US 2002/050360 A1 (STEWART R BRUCE ET AL) 2 May 2002
D3: WO 01/04535 A (STEWART R BRUCE ; COOK ROBERT LANCE (US);
ENVENTURE GLOBAL TECHNOLOGY) 18 January 2001
D4: WO 01/33037 A (STEWART R BRUCE ; COOK ROBERT LANCE (US);
COWAN KENNETH MICHAEL (US);) 10 May 2001
D5: WO 00/77431 A (FRIEDMAN MARK M ; STEWART R BRUCE (NL); SHELL
INT RESEARCH (NL); BRISC) 21 December 2000
D6: WO 99/13195 A (NOBILEAU PHILIPPE) 18 March 1999
D7: WO 01/18353 A (E2 TECH LTD ; INNES GARETH (GB); OOSTERLING
PETER (NL)) 15 March 2001
D8: US-A-6 142 230 (WRIGHT RALPH DAVID ET AL) 7 November 2000
D9: WO 02/35058 A (METCALFE PAUL DAVID ; HARRALL SIMON JOHN (GB);
TILTON FREDERICK T (US)) 2 May 2002
D10: US 2002/144822 A1 (HACKWORTH MATTHEW R ET AL) 10 October 2002
D11: US-A-3 203 451 (VINCENT RENIC P) 31 August 1965

2 INDEPENDENT CLAIM 1; INVENTION I

- 2.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 1 is not new in the sense of Article 33(2) PCT.
Document D1 discloses, particularly in paragraph 6,7,9-12,25-28,30-34 and the figures 1 to 9 (the references in parenthesis applying to this document):

An apparatus (100) for plastically expanding a tubular patch (754) in a wellbore (750, 760) comprising:

- a rotatable expander tool (100) disposable in the tubular patch, comprising a plurality of expander elements (116) radially extendible therefrom adapted to engage with the interior wall of the tubular patch and a mechanical means (610) for radially extending the expander elements; and
- at least one electric motor (605) for supplying motive power to the mechanical means for radially extending the expander elements of the expander tool, and for providing rotation to the expander tool.

2.2 The subject-matter of claim 2-6 is also known from D1, see the aforementioned passages, and these claims are therefore not new.

2.3 The document D1 discloses the use of one electric motor (605) in a sealed housing, which powers the various movements required. The problem is to provide mechanical transfer means to power the various movements from the single electric motor. The solution of claim 7 is to provide a dedicated electric motor for each of the movements. In the downhole application it is not considered trivial to power each of the movements by a dedicated electrical motor and therefore the subject-matter of claim 7 is considered to be inventive.

3 INDEPENDENT CLAIM 8; INVENTION I

3.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 8 is not new in the sense of Article 33(2) PCT. Document D1 discloses, particularly in paragraph 6,7,9-12,25-28,30-34 and the figures 1 to 9 (the references in parenthesis applying to this document):

A method for sealing a hole (753) in a tubular (752) in a wellbore (750) or for sealing an open hole interval (760) of a wellbore comprising:

- (A) introducing a tubular patch system (754, 100) into the wellbore and locating the system adjacent a hole in the tubular or adjacent the open hole interval of the wellbore that it is desired to seal, the tubular patch system comprising a tubular patch (754) and an apparatus (100) for plastically expanding the tubular patch comprising
- (a) a gripping assembly (625) comprising at least one radially extendible gripping member (630) for gripping the interior wall of the tubular patch as the patch is being introduced and located at the desired location in the wellbore and a mechanical means (611) for radially extending the gripping member(s);

- (b) a rotatable expander tool (100), disposed in the tubular patch, comprising a plurality of expander elements (116) radially extendible therefrom adapted to engage with the interior wall of the tubular patch and a mechanical means (610) for radially extending the expander elements; and
- (c) at least one electric motor (605) for supplying motive power to the mechanical means for radially extending the gripping member(s) of the gripping assembly, for supplying motive power to the mechanical means for radially extending the expander elements of the expander tool and for providing rotation to the expander tool; and
- (B) actuating the expander tool to plastically expand the tubular patch to seal off the hole in the tubular or to seal off the open hole portion of the wellbore.
- 3.2 The subject-matter of claims 9-13 is also known or obvious from D1, see the aforementioned passages, and these claims are therefore not new.
- 3.3 The subject-matter of claims 17 and 18 is considered obvious for the skilled man in the art. In light of the aforementioned passages, it is obvious to use a patch with an outer resilient member and/or to use a patch consisting of joined sections.
4. The subject-matter of the claims 21-23, 26 and 30 is also known from D1, which therefore are also considered not new

5. INDEPENDENT CLAIM 27; INVENTION II

- 5.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 27 is not new in the sense of Article 33(2) PCT. Document D6 discloses, particularly in the figures 1-20 and the passages cited in the search report (the references in parenthesis applying to this document):

A patch for deployment in a wellbore (13) at a location below a restriction (11), D1, the patch comprising a deformed irregularly shaped metal tube (figures 3,5,7,9,11,13,15) having a maximum external diameter, D2 (between 41 and 43 in figure 13), wherein the patch is capable of being reformed into a substantially regular shaped tube (figures 4,6,8,10,12,14,16) having an external diameter, D3 (diameter at 21, figure 10), where D2 is less than D1 and D3 is greater than D1 and wherein at least a section of the reformed tube is capable of being plastically (page 4, line 36 to 38) expanded to an external diameter, D4, wherein the

expansion ratio, $[D4-D3/D3] \times 100$, of the reformed tube is in the range 10 to 30%.

- 5.2 Dependent claims of the group of claims forming the second invention, namely 14-16 and 24, do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, see documents D1 to D11 and the corresponding passages cited in the search report.

6. INDEPENDENT CLAIM 28; INVENTION III

- 6.1 The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 28 is not new in the sense of Article 33(2) PCT. Document D3 discloses, particularly in figures 10d and 10e (the references in parenthesis applying to this document):

A plastically expandable tubular metal patch (1110) wherein at least one section (1180) of the metal tube is of a reduced inner diameter and hence increased wall thickness, t_1 compared with the wall thickness, t_2 of adjacent sections of the metal tube and the difference in thickness, t_1-t_2 corresponds to the radial distance over which the section of the metal tube of increased wall thickness, t_1 , is to be plastically expanded.

- 6.2 Dependent claims of the group of claims forming the third invention, namely 19,20,25 and 29, do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of inventive step, see documents D1 to D11 and the corresponding passages cited in the search report.

Re Item VII

- The independent claims are not in the two-part form in accordance with Rule 6.3(b) PCT.
- The features of the claims are not provided with reference signs placed in parentheses (Rule 6.2(b) PCT).
- The units employed on pages 7-9,12 and 13 are not additionally expressed in terms of

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the units stipulated by Rule 10.1 (a) PCT.

Re Item VIII

- Although claims 8, 21 and 30 and have been drafted as separate independent claims in the same category, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought in respect of the terminology used for the features of that subject-matter. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.